Adjustable Flow Splitter

Methods for Setting Low Split Flow

Figure 1: Low flow out

Figure 2: Inlet port

Figure 3: High flow out

Figure 4: Split flow Vernier scale on splitter body

Adjusting the Split Ratio

Split ratios are decreased by turning the adjustment knob clockwise and increased by turning the adjustment knob counterclockwise. The split ratio range can be changed by exchanging the replaceable resistor cartridge. The model 610 series adjustable splitter can be configured for either post column or pre-column splitting.

Setting the Split Ratio

Listed below are several options for setting the split ratio of an adjustable splitter. Choose the method that best suits your purposes.

Routine split ratio setting

Each flow splitter is shipped with a Manufacturing Test Log unique to that splitter. If you require a replacement copy, contact Analytical Sales & Services and provide the splitter part number and serial number. Refer to Figure 5 for a sample copy.

Set the inlet flow and the Vernier scale setting to the value listed on Manufacturing Test Log. The scale is on the splitter body (Figure 4).

Note: Once it's set, the split ratio will remain constant regardless of changes to inlet flow rate or solvent viscosity. Regarding gradients with different viscosity mobile phases, the low split flow will remain constant for Post-column applications. Accuracy is ± 10% of the listed value, on account of system-to-system variability.

High accuracy split ratios

Adjust the splitter to generate the back pressure corresponding to the desired test log low split flow. Low split flow can be set with a precision of ±2% by means of this procedure. Even higher accuracy can be achieved using the following methods:

Set splitter by means of the previous procedure. Set the low split flow to desired accuracy by making successive fine adjustments while determining flow rate by measuring volume and time with a graduated cylinder and stop watch. Note down the system back pressure! Use the results to create a low split flow - back pressure table for the system and each column. System back pressure is proportional to column back pressure and splitter back pressure:

$$\textit{System BP} = \textit{column BP} + \textit{splitter BP}$$

Figure 5

Manufacturing Test Log for 610-PO10-04 (Sample)

S/N:xxxx

Customer : xxxxxx
Ship date : xx.xx.xxxx
Leak check at inlet at 4,000 psi pass
Leak check at outlet at 4,000 psi pass
Solvent = Water
Input flow rate = 1.00 mL/min.
Split Ratio Range = 5:1 to 100:1

Vernier scale setting	Capillary flow, mL/min	Split ratio	Back Pressure, PSI
19	***0.0075***	**132.333**	***31***
22	***0.015***	**65.6667**	***69***
25	***0.0256***	**38.0625**	***122***
28	***0.0361***	**26.7008**	***178***
31	***0.0477***	**19.9644**	***243***
34	***0.0565***	**16.6991**	***286***
37	***0.0709***	**13.1044**	***357***
39	***0.0841***	**10.8906**	***423***
41	***0.1012***	**8.88142**	***509***
43	***0.1168***	**7.56164**	***589***
45	***0.1347***	**6.4239**	***681***
46	***0.143***	**5.99301**	***723***
47	***0.156***	**5.41026**	***791***
48	***0.1618***	**5.18047**	***824***
49	***0.1725***	**4.7971**	***884***
50	***0.1799***	**4.55864**	***920***

Resistor cartridge value = xxxx **psi/(ml/min)**
Comments :

Note: The above data is for zero back pressure downstream from flow splitter. Back pressure generated by splitter will vary depending on solvent viscosity, however split ratio will not be affected.

Adjust Back Pressure

Use pressure drop across the flow splitter and Ohms Law.

$$P = L \times Q2 \times V$$

***Q2*: Desired split flow, mL/min.**
***P*: Pressure drop across splitter, PSI**
***L*: Fluid resistor value PSI/mL/min. (from calibration sheet)**
***V*: Viscosity in centipoise**

Setting the Split Ratio on Pre-column Applications

It is more useful to work with actual flow rate rather than split ratio. Basic procedure is as follows:

1. Measure the pressure drop resulting from column at desired flow rate, using the same mobile phase as used in the method.
2. Refer to the Manufacturing Test Log to find the correct setting to achieve the pressure drop found in step1. See a sample test log, Figure 5.

The flow through the column can be adjusted either by changing the splitter setting, or by changing the pump flow rate. Note that during a gradient with different viscosity mobile phase, the flow rate will change as the viscosity changes - but this change will be repeatable.

Configuring for Custom Split Ratio Ranges

A variety of resistor cartridges can be ordered from Analytical Sales & Services to configure the Adjustable Flow Splitter for split ratios other than standard. Please contact technical service at 973-616-0700 for assistance in selecting the correct resistor cartridges. We will gladly assist you in determining the best splitter configuration for your application.

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